

of hernia discussed in all its varied phases by William B. Coley; with the ever-increasing problems of the surgery of the abdomen dwelt upon in all their many details by such a critic as John C. A. Gerster; and finally with an authority of such prominence as John G. Clark emphasizing the advances in gynecology that have occurred during the past year, it is small wonder that the first half of this volume offers the reader a wealth of surgical information that is indispensable. From the medical stand-point the volume is of no less interest, thanks to the usual able contribution by Alfred Stengel, who first reviews diseases of the blood, particularly leukemia and pernicious anemia, then takes up the absorbing subject of diseases of the thyroid and other ductless glands, and concludes with a discussion of diabetes, gout, and scurvy. Edward Jackson's concise but well-written review of ophthalmological advances is the concluding contribution to this really noteworthy volume.

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THE ORIGIN AND NATURE OF THE EMOTIONS. By GEORGE W. CRILE, M.D. Philadelphia and London: W. B. Saunders Company, 1915.

THE reviewer has found this well-printed book difficult to review. The views therein presented are extremely speculative, and at times so arbitrarily verbal that the reviewer has not always felt certain that the author really means what he says. Dr. Crile lays stress upon certain histological appearances described as occurring in cells of the central nervous system under conditions of disease, fatigue and experimentation. In the interpretation of these findings he makes free use of the modern concepts of internal secretion of the several ductless organs, associating them in a schematic relationship to the brain, liver, and muscular system. By means of these speculations, supported by experiments that often do not bear upon the actual question at all or permit of several interpretations, hypotheses are erected purporting to explain about everything in the domains of psychology, physiology, and pathology. The histologic changes described in the cells of the central nervous system are not commonly regarded as possessing the unequivocal quality that is here ascribed to them. The reviewer has been advised by competent neurohistologists that the methods, results and interpretations are, to say the least, still under discussion. Concerning the influences of the internal secretions of the ductless glands, the literature is today in a state of extreme confusion and contradiction, and upon the published data one could erect several incompatible systems and not be able to prove or disprove any of them. Dr. Crile generally avoids discussion of the conceptions of other workers in this field; he selects from the mass what suits his

hypothesis and leaves the rest without comment. In fact, naivety is one of the characteristics of the book, previous work of competent investigators being often entirely overlooked and statements of familiar biological fact uttered as though they were original promulgations. Anyone who feels that this stricture is too severe is requested to make the following test: The chapter entitled "A Mechanist View of Psychology" is first to be read. After this are to be read the following, bearing in different ways upon the problem: Loeb, "Mechanistic Conception of Life" (tropisms are not discussed by Dr. Crile); Mach, "The Analysis of Sensations;" Singer, "The Pulse of Life" (*Journal of Philosophy, Psychology, and Scientific Methods*, xi, 645); and Bertrand Russell, "Our Knowledge of the External World." Following this the chapter on the "Mechanistic View of Psychology" is to be re-read. The result will be illuminating. Possibly it was with the work of Loeb (and other workers in comparative psychology), in mind that Dr. Crile expressed the hope that "we dispossess ourselves of the shackles of psychology." The extreme discursiveness of the presentation cannot fail to impress the critical reader unfavorably. If the opinions expressed in the mechanistic view of psychology are correct, the systematic psychologists of all schools are, for the largest part, in the wrong, including Spencer and Bergson, who owe so much to the theory of evolution. It is, of course, possible that this is true; but judged by the evidence presented in this book, it is highly improbable. The familiar German expression, *Wer Vieles bringt wird Jedem Etwas bringen*, seems here to have been paraphrased to the effect that if one attempts to explain everything one is sure to explain something.

The statement that "love is a phylogenetic conjugation without physical action" deserves literary immortality, and indicates that Freud has overlooked something. A futurist definition of humor is contained in the following: "A common example of the same nature is that encountered on the street when a pedestrian slips on a banana peel, and, just as he is about to tumble, recovers his equilibrium. The onlookers secure relief from the integration to run to his aid by laughing. On the other hand, should the same pedestrian fall and fracture his skull, the motor integration of the onlookers would be consumed by rendering physical assistance; hence there would be no laughter." One wonders what would be the physiological situation of the onlooker who, in the event of the man not falling, finds nothing to laugh at? On page 131 the statement is made that the victim of a high-speed bullet feels no pain because his remote ancestors had not developed response to fast-moving stimuli. "There was no weapon in the prehistoric ages which could move at the speed of a bullet from the modern rifle, therefore, while slow penetration of the tissues produces great pain and muscular response, there is no response to the swiftly moving bullet." While this

realization is doubtless a source of great comfort to the unfortunate men now charging trenches in Europe, mingled with feelings of pity for their descendents who may not be thus insensible, one wonders why fear alone is invoked to explain the lack of pain in Livingstone while struggling with a lion; why might not this also have been due to the fact that his prehistoric ancestors had not struggled with lions? In each instance one of several possible variables has been arbitrarily selected, and this in the face of the fact that any form of mental preoccupation, or stress of excitement, may expell the sense of pain from consciousness. The psychology of color sensation is disposed of in the following business-like fashion: "For example, each variation in speed of the light-producing waves of ether causes a specific reaction in the brain. For one speed of ether waves the reaction is the preception of the color blue; for another, yellow; for another, violet." In what the reaction consists is apparently an immaterial detail. In discussing the relations of the outpour of emotions to "phylogenetic experience" (there are here and there in this chapter expressions that remind one of Gertrude Stein) is the following: "The emotions, then, are the preparations for phylogenetic activities. If the activities are consumed, the fuel—glycogen—and the activating secretions from the thyroid, the adrenals, the hypophysis are consumed. In the activation without action, these products must be eliminated as waste products, and so a heavy strain is put upon the organs of elimination." Where has it been shown that the products of the ductless organs are eliminated after the fashion of urea, or that this elimination is a heavy strain? The problem of consciousness—unsolved from Socrates to Royce—is elucidated in the following statement: "We have shown that the effects upon the body mechanism of the action of the various ceptors is in relation to the response made by the *brain* to the stimuli received." "What is this power of response on the part of the brain but consciousness?" The most absolute mechanist can ask for nothing more positive than the following: "If our premises are sustained, then we can recognize in man no will, no ego, no possibility for spontaneous action, for every action must be a response to the stimuli of contact or distant ceptors, or to their recall through associative memory." A purely mechanistic conception, truly (a cross between evolution and internal secretion); but there will still remain considerable difference of opinion concerning the details of the *modus operandi*. Contrasted with the phylogeny of Dr. Crile, the *deus ex machina* of the eighteenth century was a tyro. In another place Dr. Crile selects his company as follows: "Such is the stimulating force of tradition that many who have been educated under the tenets of traditional beliefs will oppose these hypotheses—even violently it may be. So they have opposed them; so they opposed Darwin; so they have opposed all new and apparently revolution-

ary doctrines." In view of the rather shabby treatment accorded to the Darwinian theory of natural selection at the Darwin anniversary dinner a few years ago, the friends of Darwin will feel glad that he has been rediscovered, though they may object to the crude and arbitrary manner in which the doctrine of evolution is applied to physiology and psychology.

Dr. Crile's views on fever are in some points contrary to the data of the literature, in other respects hypothetical and unproved. "Fever invariably and chills, often, accompany the course of the infections." This statement is simply incorrect. "We must infer, therefore, that the fever is an adaptation on the part of the host for dispatching the enemy," is stated with reference to the work of Bass in the study of the malarial parasite. Bass, in his recent lectures on malaria in Philadelphia, did not interpret the fever as a combative measure, but rather as the result of the liberation of metabolic products upon the part of the parasites. "Bacteriology has taught us that both heat and cold are fatal to pathogenic infections." Naturally a certain degree of heat is fatal. But there is no adequate warrant for the statement made that "Bacteriologists have taught us that bacteria grow best at the normal temperature of the body, hence fever must interfere with bacterial growth." For a few germs it has been shown that under the abnormal conditions of growth in the culture tube, growth is more rapid at 37° than at 40°. But there is no demonstration that in the infected body, bacteria grow less well at 40° than at 37°. "In fever, then, we have diminished intake of energy (or may have) but an increased output of energy—reviewer; hence the available potential energy of the body is rapidly consumed." In this book, as elsewhere, Dr. Crile confuses increase of body temperature with increase of heat production, apparently regarding the terms as synonymous, in the sense that increased heat production always accompanies fever. This convenient, though erroneous, assumption has led Dr. Crile in his researches to replace the measurement of heat (by direct or indirect calorimetry) by the simple use of the clinical thermometer. No consideration is given to the point of view, now under investigation, that fever may accelerate the formation of antibodies, using the term in its general sense. One is surprised to read so much of the body reactions to infections without references to immunology.

Unusual stress is laid upon considerations relating to acidity in the body, since "one would expect, *prima facie*, that the normal reaction would be altered by kinetic activation." A list of natural and experimental conditions are named in which it is asserted that the concentration of the hydrogen ions in the blood is increased beyond the range of normal variation. The experimental states described may nearly all be regarded as physiological dissolution. Indeed, Dr. Crile asks whether we may not regard acidosis as the actual final cause of death. No figures are given, no methods de-

scribed, these being reserved for a future publication. The chapter devoted to this subject opens as follows: "Alkalis and bases compose the greater part of the food of man and animals, the blood in both man and animals under normal conditions being slightly alkaline or rather potentially alkaline; that is, although in circulating blood the concentration of the OH-ions—upon which the degree of alkalinity depends—is but little more than in distilled water, yet blood has the power of neutralizing a considerable amount of acid (Starling, Wells)." Henderson, who should have been quoted in this connection, would give an accurate and much more lucid definition, without the totally meaningless statement that "alkalis and bases compose the greater part of the food of man and animals." With all that is now known of the relations of phosphate and carbonate to the neutralization of acid, of the basic and acid capacities of the blood and tissues and the relations of the concentration of the hydrogen ion to these factors as variables, only confusion is introduced by such a statement as "since at the point of death the blood is always acid, we may infer that some mechanism or mechanisms of the body were evolved for the purpose of changing bases into acids that thus energy might be liberated." Dr. Crile even speaks of the minute alkalinity of adrenalin as being of therapeutic importance. A study of the data bearing upon acid production in the body indicates that there are three degrees or stages in acid production; in the first, the acid formed in the body is neutralized by available labile cations and ammonia, with normal reaction of the blood; in the second, the body yields fixed cations, ammonia and sodium from the bicarbonate of the blood, with normal reaction maintained; in the third, the production of acid is in excess of maximum, chemically available cations, and the hydrogen ion concentration of the blood is increased. These stages naturally merge; the first is of physiological occurrence; the second is common in disease; the third stage has been very rarely observed outside of the state of dissolution. Acid production in the body is, therefore, not a qualitative but a quantitative process. Within the last ten years many estimations of the concentration of hydrogen ions in the blood have been carried out by measurement of the electromotive potential. There are two as yet unsolved methodic problems connected with the technical procedure, and one is not yet in the position of drawing fine distinctions, since the results are not yet reproducible to within one or even two millivolts. The existing data, in figures, indicate that outside of the state of dissolution, appreciable increase in the concentration of hydrogen ions in the blood and tissues is very rare. Many cases of diabetic and uremic coma, stated by Dr. Crile to present demonstrable acidity as their essential abnormality, have been determined to present values lying within normal ranges. Normal figures have been found also in exophthalmic goitre. In a few instances of terminal diabetic coma, just before death, in pro-

found narcosis, and in extreme stagnation of carbon dioxide, slight but demonstrable increase in concentration of hydrogen ions has been observed. Allowance may also be made for the occurrence, especially in young children, of sudden flooding of the body with acid, since the metabolism of the child seems to possess a power of neutralization more limited than in the adult, relatively and absolutely. But beyond this, the statements made by Dr. Crile of the widespread occurrence of demonstrable acidity are not borne out by the measurements in the literature, measurements carried out by numerous workers trained in physicochemical research. In the discussion of diabetic acidosis no mention is made of the ketonic acids; diabetic acidosis is lumped with the others. Standing upon the hypothesis that acidosis is the cause of anesthesia both induced and natural in the state of coma of disease, he states that "a reason is supplied for the use of intravenous infusions of sodium bicarbonate to overcome the coma of diabetes and uremia." The numerous physicians who, following the advice of the Naunyn school, have used alkali in the treatment of diabetic coma on the assumption that the ketonic acids formed in this disease were being combined with cation and the body spared its cations, will now feel grateful that a reason for this procedure has finally been discovered. Why alkali should be necessary at all, however, still remains unclear, for we are informed that "water, like air, neutralizes acids." That uremic and diabetic coma should thus be classed together, with our present knowledge of the relation of ketonic acids to diabetic coma and our complete ignorance of the chemical cause of uremic coma, is little less than amazing. Extreme variations of behavior seem to be exhibited by acidosis within the confines of the relatively small state of Ohio. In Cleveland, acidosis causes anesthesia; in Cincinnati, acidosis causes edema. And under the circumstances, one would naturally expect in this book some reference to the work of Fischer.

In every chapter of the book the boundless enthusiasm and engaging personality of the author are in evidence. The reader must be critical, because the author is uncritical. The attempt to expound physiology and psychology phylogenetically is not new. This particular method of attempting the demonstration is individual to the author. The reviewer does not presume to suggest that demonstration may not in future be effected; he is certain that it is not accomplished by the data and hypotheses presented in this book. The words of Russell, applied (unjustly in the opinion of the reviewer) to evolutionism as a total movement, apply to Dr. Crile's evolutionism of the emotions: "Evolutionism is rather to be regarded as a hasty generalization from certain rather special facts, accompanied by dogmatic rejection of all attempts at analysis, and inspired by interests which are practical rather than theoretical."

A. E. T.